detect a second period when the current drops below the threshold value; and

output a grounding key detection signal when the first period is greater than the second period.

18. The circuit of claim 17 wherein the comparator includes:

a first comparator circuit configured to compare the detected current with an upper threshold value; and

a second comparator circuit configured to compare the detected current with a lower threshold value.

19. The circuit of claim 18 wherein the monitoring circuit is configured to output the grounding key detection signal when the first period of the current at the first comparator circuit is greater than the second period.

20. The circuit of claim 18 wherein the monitoring circuit is configured to output the grounding key detection signal when the second period of the current at the second comparator circuit is greater than the first period.

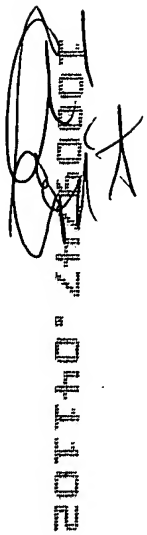
21. The circuit of claim 17 wherein the monitoring circuit includes at least one internal counter configured to count up when the upper threshold value has been exceeded by the current and at least one internal counter configured to count down when the lower threshold value has not been exceeded by the current.

22. The circuit of claim 21 wherein the monitoring circuit includes at least one internal counter configured to count up when the lower threshold value has not been exceeded by the current and at least one internal counter configured to count down when the lower threshold value has been exceeded by the current.

23. The circuit of claim 22 wherein the internal counter is configured to perform a counting process for a predetermined period.

24. The circuit of claim 23 wherein the counting period is adjustable and configured to correspond to at least half of a period of an interference signal having a maximum interference frequency.

25. The circuit of claim 23 wherein the counting period is adjustable and configured to correspond to at least half of a period of an interference signal having a minimum interference frequency.



26. The circuit of claim 25 wherein the minimum interference frequency of the interference signal is a frequency from a group consisting of 16 2/3 Hertz (Hz), 50Hz, 60Hz, or 120 Hz.

27. The circuit of claim 18 wherein the upper threshold value is positive 17 milli-Amperes (mA) and the lower threshold value is negative 17 mA.

28. The circuit of claim 17 wherein the monitoring circuit includes a polarity detection device configured to detect a polarity of the current.

29. The circuit of claim 28 wherein an internal counter of the polarity detection device is configured to count a number of polarity changes of the current.

30. The circuit of claim 29 wherein if a predetermined adjustable threshold count is exceeded, the polarity detection device is configured to output an external alternating current signal.

31. The circuit of claim 1 wherein the monitoring signal is configured to output the grounding key detection signal after a predetermined adjustable period has elapsed.

32. The circuit of claim 31 wherein the predetermined adjustable period is 4 milliseconds (ms).

33. The circuit of claim 31 wherein an internal counter of the monitoring circuit detects a lapse of the predetermined adjustable period.

34. The circuit of claim 1 wherein the current detection device is an integrated circuit for digital telephone switching.

35. A method for interference-proof detection in the operation of a grounding key, the method comprising:

detecting a current flowing when the grounding key is in operation;

comparing the detected current with at least one threshold value;

detecting a first period during which the current exceeds the threshold value and detecting a second period during which the current drops below the threshold value; and

outputting a grounding key detection signal when the first period is greater than the second period.

36. The method of claim 35 further comprising outputting the grounding key detection signal when the first period is greater than the second period and a predetermined adjustable period has elapsed.

37. The method of claim 35 further comprising:

comparing the detected current with an upper threshold value; and

comparing the detected current with a lower threshold value.

38. The method of claim 37 further comprising outputting the grounding key detection signal when the first period of the current at the first comparator circuit is greater than the second period.

39. The method of claim 37 further comprising outputting the grounding key detection signal when the second period of the current at the second comparator circuit is greater than the first period.

40. The method of claim 37 further comprising counting up when the upper threshold value has been exceeded by the current and counting down when the lower threshold value has not been exceeded by the current.

41. The method of claim 37 further comprising counting up when the lower threshold value has not been exceeded by the current and counting down when the lower threshold value has been exceeded by the current.

42. The method of claim 37 further comprising counting processes for a predetermined period.

43. The method of claim 42 further comprising adjusting the predetermined period to correspond to at least half of a period of an interference signal having a maximum interference frequency.

44. The method of claim 42 further comprising adjusting the counting period to correspond to at least half of a period of an interference signal having a minimum interference frequency. --

In the abstract:

Replace the abstract with the following version.

-- A grounding key detecting device and method for interference-proof detection of the operation of grounding keys in telephones. A circuit that detects the operation of a grounding key includes a current detection device configured to detect a current flowing when the